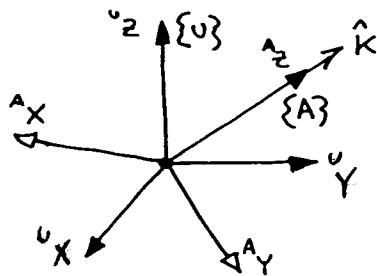


Homework HINT

2.6) IMAGINE A FRAME $\{A\}$ WHOSE \hat{z} AXIS IS ALIGNED WITH THE DIRECTION \hat{k} :



THEN, THE ROTATION WHICH ROTATES VECTORS ABOUT \hat{k} BY θ DEGREES COULD BE WRITTEN:

$$R = {}^U_A R \text{ ROT}(\hat{z}, \theta) {}^A_U R \quad [1]$$

WE WRITE THE DESCRIPTION OF $\{A\}$ IN $\{U\}$ AS:

$${}^U_A R = \begin{bmatrix} a_x & b_x & k_x \\ a_y & b_y & k_y \\ a_z & b_z & k_z \end{bmatrix} = \begin{bmatrix} \hat{a} & \hat{b} & \hat{k} \end{bmatrix}$$

IF WE MULTIPLY OUT EQ. [1] ABOVE, AND THEN SIMPLIFY USING THE FACT THAT

BOTH ${}^U_A R$ AND ${}^A_U R$ ARE ORTHONORMAL (ROWS & COLUMNS) AND THAT ${}^A_U R = ({}^U_A R)^T$, AND THAT $\hat{k} = \hat{a} \times \hat{b}$

WE ARRIVE AT EQ. (2.80) IN THE BOOK.